IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application:

LISTING OF CLAIMS:

1. (Currently Amended) A physical layer device (PHY) that is capable of communicating at least about ten gigabits per second (10 Gb/s) and performing cable diagnostics on at least one of a plurality of transmission lines that form one of a corresponding plurality of links that is coupled to the PHY, the PHY comprising:

a transceiver section for each of the plurality of transmission lines, the transceiver section has an input path and an output path and the transceiver section is capable of communicating and diagnosing at least one of the plurality of transmission lines,

the input path comprising a receiver having an input coupled to the corresponding link, an analog-to-digital converter (ADC) having an input coupled to an output of the receiver, at least one far end cross talk (FEXT)/near end cross talk (NEXT) canceller section, an alien noise canceller section, and an equalizer section and

the output path comprising a coding and preconditioning section, a digital-to-analog converter (DAC) having an input coupled to an output of the coding and preconditioning section, and a transmitter having an input coupled to an output of the DAC and having an output coupled to the corresponding link.

2. (Currently Amended) The PHY as defined in claim 1, wherein the cable comprises four transmission lines ~~and links~~ and the PHY comprises four transceiver sections with one transceiver section for each link.

3. (Original) The PHY as defined in claim 2, wherein, taken together, the four transceiver sections comprise four receivers, four ADCs, six FEXT/NEXT canceller sections, one alien noise canceller section, four equalizer sections, four coding and preconditioning sections, four DACs, and four transmitters.

4. (Original) The PHY as defined in claim 1, wherein the PHY performs cable diagnostics without a link partner.

5. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize signal attenuation of at least one of the plurality of links.

6. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize signal attenuation versus frequency of at least one of the plurality of links.

7. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize a length for at least one of the plurality of links.

8. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize FEXT coupling of at least one pair of the plurality of links.

9. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize NEXT coupling of at least one pair of the plurality of links.

10. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize alien noise levels of at least one of the plurality of links.

11. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize at least one of the plurality of links by utilizing Time Domain Reflectometry.

12. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize at least one of the plurality of links by utilizing continuous test tones.

13. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize at least one of the plurality of links by utilizing filter coefficients of the equalizer section.

14. (Original) The PHY as defined in claim 4, wherein the PHY performs cable diagnostics to characterize at least one of the plurality of links by lowering a transmit level of the PHY and monitoring a Bit Error Ratio to determine an alien noise level.

15. (Original) The PHY as defined in claim 1, wherein the PHY performs cable diagnostics with at least a second PHY as a link partner.

16. (Original) The PHY as defined in claim 15, wherein the PHY performs cable diagnostics to characterize at least one of the plurality of links by examining a profile of a signal that is received by the receiver of the PHY.

17. (Original) The PHY as defined in claim 15, wherein the PHY performs cable diagnostics to characterize at least one of the plurality of links by utilizing filter coefficients of the at least one FEXT/NEXT canceller section of the PHY.

18. (Original) The PHY as defined in claim 15, wherein the PHY monitors a change in one or more of the characteristics in at least one of the plurality of links to forecast a potential or diagnose an actual failure of at least one of the plurality of links.

19. (Original) The PHY as defined in claim 15, wherein the PHY performs cable diagnostics to characterize at least one of the plurality of links by receiving a lowered transmit level from the second PHY and monitoring a Bit Error Ratio to determine an alien noise level.

20. (Original) A method of performing cable diagnostics in a communications system that is capable of communicating at least about ten gigabits per second (10 Gb/s), the system comprises a physical layer device (PHY) and four transmission lines that each form a corresponding link for a total of four links, each of the transmission lines is coupled to the PHY, the PHY comprises a transceiver section for each of the transmission lines for a total of four transceiver sections, the four transceiver sections combined comprise four receivers, four analog-to-digital converters (ADC), six far end cross talk (FEXT)/near end cross talk (NEXT) canceller sections, an alien noise canceller section, four equalizer sections, four coding and preconditioning sections, four digital-to-analog converters (DAC), and four transmitters, the method comprising:

performing cable diagnostics by utilizing the PHY to characterize at least one of the four links.

21. (Original) The method as defined in claim 20, wherein the PHY operates without a link partner.

22. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing signal attenuation of at least one of the four links.

23. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing signal attenuation versus frequency of at least one of the four links.

24. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing a length for at least one of the four links.

25. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing FEXT coupling of at least one pair of the four links.

26. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing NEXT coupling of at least one pair of the four links.

27. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing alien noise levels of at least one of the four links.

28. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing at least one of the four links by utilizing Time Domain Reflectometry.

29. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing at least one of the four links by utilizing continuous test tones.

30. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing at least one of the four links by utilizing filter coefficients of at least one of the four equalizer sections.

31. (Original) The method as defined in claim 21, wherein performing cable diagnostics includes characterizing at least one of the four links by lowering a transmit level of the PHY and monitoring a Bit Error Ratio to determine an alien noise level.

32. (Original) The method as defined in claim 20, wherein the PHY performs cable diagnostics with at least a second PHY as a link partner.

33. (Original) The method as defined in claim 32, wherein performing cable diagnostics includes characterizing at least one of the four links by examining a profile of a signal that is received by at least one of the four receivers of the PHY.

34. (Original) The method as defined in claim 32, wherein performing cable diagnostics includes characterizing at least one of the four links by utilizing filter coefficients of at least one of the six FEXT/NEXT canceller sections of the PHY.

35. (Original) The method as defined in claim 32, wherein the PHY monitors a change in one or more of the characteristics in at least one of the four links to forecast a potential or diagnose an actual failure of at least one of the four links.

36. (Original) The method as defined in claim 32, wherein the PHY performs cable diagnostics to characterize at least one of the four links by receiving a lowered transmit level from the second PHY and monitoring a Bit Error Ratio to determine an alien noise level.

37. (Original) An apparatus for performing cable diagnostics in a communications system that is capable of communicating at least about ten gigabits per second (10 Gb/s), the system comprises a physical layer device(PHY) and four transmission lines that each form a corresponding link for a total of four links, each of the transmission lines is coupled to the PHY, the PHY comprises a transceiver section for each of the transmission lines for a total of four transceiver sections, the four transceiver sections combined comprise four receivers, four analog-to-digital converters (ADC), six far end cross talk (FEXT)/near end cross talk (NEXT) canceller sections, an alien noise canceller section, four equalizer sections, four coding and preconditioning sections, four digital-to-analog converters (DAC), and four transmitters, the apparatus comprising:

means for performing cable diagnostics by utilizing the PHY to characterize at least one of the four links.

38. (Original) The apparatus as defined in claim 37, wherein the PHY operates without a link partner.

39. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing signal attenuation of at least one of the four links.

40. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing signal attenuation versus frequency of at least one of the four links.

41. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing a length for at least one of the four links.

42. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing FEXT coupling of at least one pair of the four links.

43. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing NEXT coupling of at least one pair of the four links.

44. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing alien noise levels of at least one of the four links.

45. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing at least one of the four links by utilizing Time Domain Reflectometry.

46. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing at least one of the four links by utilizing continuous test tones.

47. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing at least one of the four links by utilizing filter coefficients of at least one of the four equalizer sections.

48. (Original) The apparatus as defined in claim 38, wherein the means for performing cable diagnostics includes characterizing at least one of the four links by lowering a transmit level of the PHY and monitoring a Bit Error Ratio to determine an alien noise level.

49. (Original) The apparatus as defined in claim 37, wherein the PHY performs cable diagnostics with at least a second PHY as a link partner.

50. (Original) The apparatus as defined in claim 49, wherein the means for performing cable diagnostics includes characterizing at least one of the four links by examining a profile of a signal that is received by at least one of the four receivers of the PHY.

51. (Original) The apparatus as defined in claim 49, wherein the means for performing cable diagnostics includes characterizing at least one of the four links by utilizing filter coefficients of at least one of the six FEXT/NEXT canceller sections of the PHY.

52. (Original) The apparatus as defined in claim 49, wherein the PHY monitors a change in one or more of the characteristics in at least one of the four links to forecast a potential or diagnose an actual failure of at least one of the four links.

53. (Original) The apparatus as defined in claim 49, wherein the PHY performs cable diagnostics to characterize at least one of the four links by receiving a lowered transmit level from the second PHY and monitoring a Bit Error Ratio to determine an alien noise level.

54. (New) The PHY of claim 1, wherein the transceiver section for each of the plurality of transmission lines is configured to pass communications at a rate of at least about ten gigabits per second (10 Gb/s).

55. (New) The PHY of claim 54, wherein the transceiver section, when diagnosing at least one of the plurality of transmission lines, is configured to:

detect a signal attenuation characteristic of the at least one of the plurality of transmission lines, a FEXT/NEXT coupling characteristic of the at least one of

the plurality of transmission lines, and an alien noise level characteristic of the at least one of the plurality of transmission lines; and

detect operability of a link to pass communications at a rate of at least about 10Gb/s, the link corresponding to the at least one of the plurality of transmission lines, based upon a combination of the signal attenuation characteristic, FEXT/NEXT coupling characteristic, and the alien noise level characteristic of the at least one of the plurality of transmission lines, wherein the alien noise level characteristic relates to a dynamic noise received by the link from an outside source, and wherein each of the signal attenuation characteristic, FEXT/NEXT coupling characteristic, and the alien noise level characteristic is expressed as a function of frequency.

56. (New) The method of claim 20, wherein performing cable diagnostics by utilizing the PHY to characterize at least one of the four links comprises:

detecting a signal attenuation characteristic of the at least one of the plurality of transmission lines, a FEXT/NEXT coupling characteristic of the at least one of the plurality of transmission lines, and an alien noise level characteristic of the at least one of the plurality of transmission lines, wherein the alien noise level characteristic relates to a dynamic noise received by the link from an outside source, and wherein each of the signal attenuation characteristic, FEXT/NEXT coupling characteristic, and the alien noise level characteristic is expressed as a function of frequency; and

detecting operability of a link to pass communications at a rate of at least about 10Gb/s, the link corresponding to the at least one of the plurality of transmission lines, based upon a combination of the signal attenuation characteristic, FEXT/NEXT coupling characteristic, and the alien noise level characteristic of the at least one of the plurality of transmission lines.